

## P. ENT COOPERATION TREA

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION  
(PCT Rule 61.2)

Date of mailing (day/month/year) 26 July 2000 (26.07.00)	To:  Assistant Commissioner for Patents United States Patent and Trademark Office Box PCT Washington, D.C.20231 ETATS-UNIS D'AMERIQUE
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in its capacity as elected Office

International application No. PCT/US99/28089	Applicant's or agent's file reference 50435-041
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International filing date (day/month/year) 24 November 1999 (24.11.99)	Priority date (day/month/year) 25 November 1998 (25.11.98)
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## Applicant

LIANG, Sheng et al

1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:

23 June 2000 (23.06.00)

in a notice effecting later election filed with the International Bureau on:

\_\_\_\_\_

2. The election  was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  Antonia Muller
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Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38
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## PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF RECEIPT OF  
RECORD COPY

(PCT Rule 24.2(a))

RECEIVED

MAR 07 2000

MW3cE

To:

STEWART, David, L.  
 McDermott Will & Emery  
 600 13th Street, N.W.  
 Washington, DC 20005-3096  
 ÉTATS-UNIS D'AMÉRIQUE

Date of mailing (day/month/year) 21 February 2000 (21.02.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 50435-041	International application No. PCT/US99/28089

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

SUN MICROSYSTEMS, INC. (for all designated States except US)  
 LIANG, Sheng et al (for US)

International filing date : 24 November 1999 (24.11.99)

Priority date(s) claimed : 25 November 1998 (25.11.98)

Date of receipt of the record copy by the International Bureau : 08 February 2000 (08.02.00)

List of designated Offices :

AP : GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW

EA : AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

EP : AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

OA : BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

National : AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW

## ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- time limits for entry into the national phase
- confirmation of precautionary designations
- requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO  
 34, chemin des Colombettes  
 1211 Geneva 20, Switzerland  
 Facsimile No. (41-22) 740 14 35

Authorized officer:   
 Dorothee Mülhausen  
 Telephone No. (41-22) 338 83 38

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

STEWART, David L.  
McDermott, Will & Emery  
600 13th Street, N.W.  
Washington DC 20005-3096  
ETATS-UNIS D'AMERIQUE

**PCT**

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing (day/month/year)	22.02.2001
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Applicant's or agent's file reference  
50435-041

**IMPORTANT NOTIFICATION**

International application No.  
PCT/US99/28089

International filing date (day/month/year)  
24/11/1999

Priority date (day/month/year)  
25/11/1998

Applicant  
SUN MICROSYSTEMS, INC. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

**4. REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Koski, P  Tel. +49 89 2399-2709
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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 50435-041	<b>FOR FURTHER ACTION</b>		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US99/28089	International filing date (day/month/year) 24/11/1999	Priority date (day/month/year) 25/11/1998	
International Patent Classification (IPC) or national classification and IPC G06F11/34			
Applicant SUN MICROSYSTEMS, INC. et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I    <input checked="" type="checkbox"/> Basis of the report</li> <li>II    <input type="checkbox"/> Priority</li> <li>III    <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV    <input type="checkbox"/> Lack of unity of invention</li> <li>V    <input type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI    <input type="checkbox"/> Certain documents cited</li> <li>VII    <input checked="" type="checkbox"/> Certain defects in the international application</li> <li>VIII    <input type="checkbox"/> Certain observations on the international application</li> </ul>			

Date of submission of the demand 23/06/2000	Date of completion of this report 22.02.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Breche, P  Telephone No. +49 89 2399 2163



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/28089

## I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*):

### Description, pages:

1-52 as originally filed

### Claims, No.:

1-38 as originally filed

### Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description,        pages:
- the claims,        Nos.:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/28089

the drawings,      sheets:

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

### III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

the entire international application.  
 claims Nos. 1-38.

because:

- the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1-38 are so unclear that no meaningful opinion could be formed (*specify*):  
**see separate sheet**
- the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- no international search report has been established for the said claims Nos. .
2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:
- the written form has not been furnished or does not comply with the standard.  
 the computer readable form has not been furnished or does not comply with the standard.

### VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US99/28089

**Concerning section III**

1. The clarity objections raised in sections VIII for independent claims do not allow to identify "the claimed invention" on which an opinion should be based in the sense of Article 33.1 PCT.
2. A full preliminary examination could not take place since the claims have not been clarified, see section VIII, in particular with respect the technical features disclosed in section 5.3.

However, the attention of the applicant is already drawn to the following additional remark: the subject-matter of claim 32 is clearly not new since the implementation of a standard gc in a standard Java Virtual Machine covers this subject-matter.

**Concerning section VII**

Reference is made to the following documents:

**D1:** Third International Journal of Supercomputer Applications and High Performance Computing, US, MIT press, Vol. 9, no. 2, 1 June 1995 (1995-06-01), pages 108-127. Beguelin a et al: "*Recent enhancements to PVM*".

**D2:** WO 98 48353 A

3. Additional Reference signs in parentheses should have been inserted in the claims to increase their intelligibility, Rule 6.2.(b) PCT.
4. In order to put the invention into proper perspective (see PCT Guidelines, C-II, 4.4), documents **D1** and **D2** should have been identified in the description and the relevant background art disclosed therein should be discussed to meet the requirements of Rule 5.1 (a)(ii) PCT.

**Concerning section VIII**

5. The attention of the applicant is drawn to the following Article 6 PCT objections raised for independent claims:
  - 5.1. The definitions of the invention given in the independent claims **1, 10, 11, 20, 21, 31, 32 and 33**, each reciting a different combination of limitations expressed at different levels of generalizations, are such that the subject-matter for which actually protection is sought cannot be determined and therefore the method claims as a whole are neither clear nor concise, contrary to Article 6 PCT.  
Two or more independent claims in the same category are allowable where it is

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US99/28089

not appropriate, having regard to the subject-matter of the invention, to cover this by a single independent claim (see PCT Guidelines C-III, 5.1).

- 5.2. The category of claims **32** to **38** is not clear. With the wording "*A Virtual Machine comprising a process*" or "*A Virtual Machine having a standard profiler interface*", independent claims **32** and **33** are directed to a virtual machine (e.g. Java or Lisp VM) which is by definition the specification of an abstract machine. This appears to be not an acceptable category and should be formulated as a method claim, which appear to be appropriate, in order to constitute acceptable claims.
- Moreover, conciseness with the other independent method claims is required.
- 5.3. The wording "*said at least one event is independent of any algorithm*" disclosed in independent claims **1**, **11** and **21** is not clear since what the events are is not clear and since five algorithms only are supported by the description. From figure 2 and from the description on page 1, line 2, page 3, lines 20-26, line 31-page 4, line 3, page 10, lines 12-15, lines 30-32, it is clear that *the combination of the five events as disclosed in claim 4 sent by the Virtual Machine to a profiler agent through the Virtual Machine profiler interface gives comprehensive information for profiling garbage-collected memory systems covering the five classical garbage collector algorithms used in Java VM implementations disclosed in claims 34 to 38* (page 7, lines 1-6, pages 11 to 14), i.e. the *Mark-and-Sweep* garbage collector, the *Mark-Compact* garbage collector, the *Two-Space Copying* garbage collector, the *Generational* garbage collector, and the *Reference-Counting* garbage collector. The above technical features in italic and the subject-matter of claim 4 should have been clear from the wording of said independent claims.
- 5.4. From the description on page 7, lines 7-8, it understood that a "*heap arena*" describes a *logically partitioned portion of the heap for allocation of new objects within the heap*. However, this not clear from the present wording of independent claims **1**, **11** and **21**.
6. The statement referring to the spirit and scope of the invention in the description on page **17**, lines 16-18, is inconsistent with the definition of the matter for which protection is sought in the claims, contrary to Article 6 PCT. The statement should therefore have been deleted.

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>50435-041</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 99/28089</b>	International filing date (day/month/year) <b>24/11/1999</b>	(Earliest) Priority Date (day/month/year) <b>25/11/1998</b>
Applicant <b>SUN MICROSYSTEMS, INC. et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

- the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- contained in the international application in written form.
  - filed together with the international application in computer readable form.
  - furnished subsequently to this Authority in written form.
  - furnished subsequently to this Authority in computer readable form.
  - the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
  - the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2.  Certain claims were found unsearchable (See Box I).

3.  Unity of Invention is lacking (see Box II).

4. With regard to the title,

- the text is approved as submitted by the applicant.
- the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- the text is approved as submitted by the applicant.
- the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

- as suggested by the applicant.
- because the applicant failed to suggest a figure.
- because this figure better characterizes the invention.

2

None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 99/28089

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G06F11/34 G06F12/02

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BEGUELIN A ET AL: "RECENT ENHANCEMENTS TO PVM" 3HE INTERNATIONAL JOURNAL OF SUPERCOMPUTER APPLICATIONS AND HIGH PERFORMANCE COMPUTING, US, MIT PRESS, vol. 9, no. 2, 1 June 1995 (1995-06-01), pages 108-127, XP000589496 ISSN: 1078-3482 page 120, left-hand column, line 6 -right-hand column, line 7 ---	10,20, 30,31,33
X	WO 98 48353 A (SUN MICROSYSTEMS INC) 29 October 1998 (1998-10-29) page 2, line 26 - line 36	32
A	page 5, line 17 - line 34 ---	1-9, 11-19, 21-31, 33,37
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

28 April 2000

Date of mailing of the international search report

09/05/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
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Authorized officer

Nielsen, O

## INTERNATIONAL SEARCH REPORT

ational Application No  
PCT/US 99/28089

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	"MEMORY ALLOCATION MONITORING CLASS" IBM TECHNICAL DISCLOSURE BULLETIN, US, IBM CORP. NEW YORK, vol. 37, no. 4A, 1 April 1994 (1994-04-01), page 445 XP000446733 ISSN: 0018-8689 the whole document ---	1-38
A	US 5 621 912 A (KROL STEVEN M ET AL) 15 April 1997 (1997-04-15) column 1 -column 4, line 67 ---	1, 10, 11, 20, 21, 30
A	EP 0 777 181 A (HEWLETT PACKARD CO) 4 June 1997 (1997-06-04) column 1 -column 2, line 38 -----	1, 10, 11, 20, 21, 30, 31, 33

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/US 99/28089

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 9848353	A 29-10-1998	US 5953736 A EP 0914634 A		14-09-1999 12-05-1999
US 5621912	A 15-04-1997	NONE		
EP 0777181	A 04-06-1997	US 5838976 A JP 9237203 A		17-11-1998 09-09-1997

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

Int. Application No

PCT/US 98/07624

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 5367685	A 22-11-1994	EP 0604002	A 29-06-1994	JP 6230976 A 19-08-1994
EP 0737914	A 16-10-1996	US 5619665	A 08-04-1997	JP 8297572 A 12-11-1996